PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2003-187624
(43)Date of publication of application : 04.07.2003

(51)Int.Cl. F21V 8/00
G02B 6/00
G02F 1/13357
H01L 33/00
// F21Y101:02

(21)Application number : 2001-388523
(22)Date of filing : 20.12.2001

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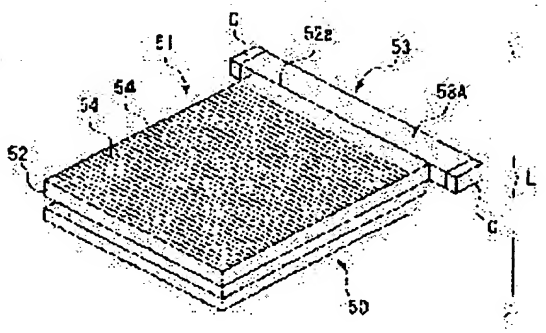
(54) PLANAR LIGHTING DEVICE AND LIQUID CRYSTAL DISPLAY DEVICE

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a planar lighting device and a liquid crystal display device capable of a bright illumination with an effective use of light irradiated from a light-emitting element.
SOLUTION: With the planar lighting device provided with a light guide body 53 equipped with light-emitting units C and a light guide plate 52 in which light emitted from the light-emitting units is guided to the light guide plate through the light guide body and is emitted from a light-emitting face of the light guide plate, the light-emitting unit is so structured that a positive electrode side and a negative electrode side lead frames are fitted to a fitting body with a bottom part and a wall part so as to be separate from each other and individually in contact with the bottom part, of which, one lead frame is fitted with a light-emitting element whose one electrode is electrically connected and the other lead frame is electrically connected to the other electrode of the light- emitting element, while a lens part condensing light emitted from the light- emitting element is formed at a top part of the fitting body.



LEGAL STATUS

[Date of request for examination] 03.06.2004

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] It comes to provide the transparent material which equipped the edge with luminescence equipment, and the light guide plate connected to this transparent material. The light by which outgoing radiation was carried out is led to a light guide plate through said transparent material from said luminescence equipment. It is the field-like lighting system which carries out outgoing radiation from the outgoing radiation side of this light guide plate. Said luminescence equipment Estrange mutually and the leadframe by the side of a positive electrode and a negative electrode is attached in the attachment object which has a pars basilaris ossis occipitalis and a wall so that it may touch separately at said pars basilaris ossis occipitalis. A light emitting device is attached in one leadframe, and one electrode of this light emitting device is connected electrically. The field-like lighting system characterized by having the configuration in which it comes to form in said attachment object upper part the lens section which condenses the light by which outgoing radiation was carried out from said light emitting device while the electrode of another side of said light emitting device is electrically connected to the leadframe of another side.
[Claim 2] The field-like lighting system according to claim 1 characterized by an inclined plane being formed in the field by the side of said light emitting device of said wall, and coming to form the light reflex section in this inclined plane.
[Claim 3] The field-like lighting system according to claim 1 characterized by the attachment object which has said pars basilaris ossis occipitalis and wall enclosing said a part of leadframe, and really coming to fabricate it with resin.
[Claim 4] It comes to provide the transparent material which equipped the edge with luminescence equipment, and the light guide plate connected to this transparent material. The light by which outgoing radiation was carried out is led to a light guide plate through said transparent material from said luminescence equipment. It is the field-like lighting system which carries out outgoing radiation from the outgoing radiation side of this light guide plate. Said luminescence equipment Estrange mutually and the leadframe by the side of a positive electrode and a negative electrode is attached in the attachment object which has a pars basilaris ossis occipitalis and a wall so that it may touch separately at said pars basilaris ossis occipitalis. A light emitting device is attached in one leadframe, and one electrode of this light emitting device is connected electrically. The field-like lighting system which the field by the side of said light emitting device of said wall is made into an inclined plane, and is characterized by having the configuration which comes to form in this inclined plane the light reflex section which reflects the light by which outgoing radiation was carried out from said light emitting device while the electrode of another side of said light emitting device is electrically connected to the leadframe of another side.
[Claim 5] It comes to provide the transparent material which equipped the edge with luminescence equipment, and the light guide plate connected to this transparent material. The light by which outgoing radiation was carried out is led to a light guide plate through said transparent material from said luminescence equipment. It is the field-like lighting system which carries out outgoing radiation from the outgoing radiation side of this light guide plate. Said

luminescence equipment Estrange mutually and the leadframe by the side of a positive electrode and a negative electrode is attached in the attachment object which has a pars basilaris ossis occipitalis and a wall so that it may touch separately at said pars basilaris ossis occipitalis. While a light emitting device is attached in one leadframe and one electrode of this light emitting device is connected electrically While the electrode of another side of said light emitting device is electrically connected to the leadframe of another side It comes to form the light reflex section which reflects the light by which the field by the side of said light emitting device of said wall was made into the inclined plane, and outgoing radiation was carried out to this inclined plane from said light emitting device. The field-like lighting system characterized by having the configuration with which the attachment object which has said pars basilaris ossis occipitalis and wall encloses said a part of leadframe, and it really comes to fabricate it with resin.

[Claim 6] The field-like lighting system according to claim 1 to 5 characterized by a transparence resin layer being formed in the part divided by said pars basilaris ossis occipitalis and said wall, and a lens member being joined on this transparence resin layer, and coming to constitute the lens section.

[Claim 7] The field-like lighting system according to claim 1 to 6 characterized by coming to form the light reflex section on the pars basilaris ossis occipitalis of said attachment object.

[Claim 8] The field-like lighting system according to claim 1 to 7 characterized by coming to form the light reflex section in the apical surface of the wall of said attachment object.

[Claim 9] The field-like lighting system according to claim 1 to 8 with which said light reflex section is characterized by consisting of the aggregate or fluorescent paint of a metal powder of light reflex nature, such as silver dust, gold dust, and aluminium powder.

[Claim 10] Are the structure where the light emitting device was installed on the pars basilaris ossis occipitalis of said attachment object, and the horizontal distance from the core of this light emitting device to the upper limit section of the inclined plane of said wall is assumed to be X1. Assume the wall height from the top face of a pars basilaris ossis occipitalis to the upper limit section of a wall to be Hwall, and the lens section maximum thickness from the top face of a pars basilaris ossis occipitalis to the upper limit center section of the lens section is assumed to be H1. A field-like lighting system given in either of claims 2 and 3 characterized by satisfying the relation of the following formulas when the height of a light emitting device is assumed to be H and the curvature of the lens section is set to Rlens.

$| Rlens-\{(H1-Hwall)^2+X12\} / 2(H1-Hwall) |<0.5$ -- [Claim 11] Are the structure where the light emitting device was installed on the pars basilaris ossis occipitalis of said attachment object, and the inclined plane of said wall is formed in the shape of a curved surface. The horizontal distance from the core of this light emitting device to the upper limit section of the inclined plane of said wall is assumed to be X1. A field-like lighting system given in either of claims 2, 4, 5, 6, 7, 8, 9, and 10 characterized by satisfying the relation of the following formulas when the wall height from the top face of a pars basilaris ossis occipitalis to the upper limit section of a wall is assumed to be Hwall and the inclination condition of said inclined plane is set to Rwall.

$| Rwall-\{(X1-X0)^2+Hwall2\}/2(X1-X0) |<0.5$ -- [Claim 12] Are the structure where the light emitting device was installed on the pars basilaris ossis occipitalis of said attachment object, and the inclined plane of said wall is formed in the shape of a curved surface. A field-like lighting system given in either of claims 2, 4, 5, 6, 7, 8, 9, 10, and 11 characterized by satisfying the relation of the following formulas when the wall height from the top face of said pars basilaris ossis occipitalis to the upper limit section of a wall is assumed to be Hwall and the height of a light emitting device is assumed to be H.

$\{(Hwall-H)/(X1-X)\}-1/21/2|<0.4$ -- [Claim 13] The liquid crystal display characterized by mating and forming a field-like lighting system according to claim 1 to 12 in a liquid crystal display unit.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the field-like lighting system possessing the luminescence equipment which comes to prepare a light emitting device for an attachment object, and the liquid crystal display equipped with it.
[0002]
[Description of the Prior Art] The light emitting device which consists of light emitting diode (LED;Light Emitting Diode) is widely used as the light source of the front light of a liquid crystal display, or a back light, or the light source of various displays. Generally, this kind of LED light emitting device comes to prepare the electrode by the side of a positive electrode, and the electrode by the side of a negative electrode in luminescent semi-conductor substrates, such as ZnSe, contains this semi-conductor substrate in packages, such as a product made of resin, prepares an external electrode in the exterior of that package, and is constituted. If drawing 17 shows the example of 1 structure of this kind of LED luminescence equipment and is in the LED luminescence equipment A of this example of structure The substrate 100 which consists of a glass epoxy resin etc. is formed, and the horseshoe-shaped lead electrode plates 102 and 103 of a configuration are attached in the both ends by return. The semiconductor chip 105 as a light emitting device is attached on the electrode plate 102 on the 1 side edge section of this substrate 100. While the electrode plate 103 of a side besides a substrate 100 is connected to the electrode by the side of the upper part of this semiconductor chip 105 by wirebonding by the wire line 106 The protective cover layer 107 which covers the top face of a substrate 100, a semiconductor chip 105, and wire line 106 grade, and consists of transparence resin is formed. In addition, the polar zone is formed in the pars basilaris ossis occipitalis of a semiconductor chip 105, this polar zone is connected to the top face of the lead electrode plate 102 by die bonding, and the semiconductor chip 105 is being fixed. The luminescence equipment A of the structure shown in drawing 17 is made into the structure of carrying out outgoing radiation of the light and making it emitting light from a semiconductor chip 105 by energizing to a semiconductor chip 105 through the lead electrode plates 102 and 103 which serve as an electrode.
[0003] In the luminescence equipment A of a configuration of being shown in drawing 17 , since a semiconductor chip 105 is a thing of the perimeter which carries out outgoing radiation of the light in all the directions mostly Although the light by which outgoing radiation was carried out to the top-face side of a substrate 100 in the substrate top face and the direction of a right angle can be used effectively as an outgoing radiation light from luminescence equipment A For example, the light by which outgoing radiation was carried out in the direction parallel to substrate 100 top face, for example, the longitudinal direction of drawing 17 , or the direction of right-and-left slant has the problem which cannot be used effectively since it is suitable in the different direction from the direction of the purpose. Then, the luminescence equipment B of a configuration of that the side attachment wall 108 tended to be set up to the perimeter side of said substrate 100 as shown in drawing 18 , the light by which outgoing radiation was sideways carried out from the semiconductor chip 105 using this side attachment wall 108 tended to be drawn as much as possible in the direction of a right angle to the substrate 100, and it was going

to use outgoing radiation light effectively conventionally is proposed.
[0004]
[Problem(s) to be Solved by the Invention] However, with the structure of the luminescence equipment B shown in drawing 17 , it will be necessary to attach separately but so that it may not interfere in a side attachment wall 108 with the lead electrode plates 102 and 103 on a substrate 100, and especially, when the luminescence equipment B itself was the minute components of several mm angle, time is taken in installation of a side-attachment-wall part, and there was a problem to which a production process becomes complicated. Moreover, if it was in the luminescence equipments A and B shown in drawing 17 and drawing 18 , although the horseshoe-shaped lead electrode plates 102 and 103 were attached in the both ends of a substrate 100, there was a problem that the installation reinforcement to the lead electrode plates 102 and 103 was not enough, and it was difficult to fully raise the bonding strength between each [these] part in the case of attaching a side attachment wall 108 where the lead electrode plates 102 and 103 are attached in a substrate 100.
[0005] On the other hand, although the reflective mold liquid crystal display is widely used for the cellular phone, the Personal Digital Assistant, etc. from the description that power consumption is small, this kind of reflective mold liquid crystal display has the problem that a display in the dark place which cannot use the external light source is extremely inferior. In order to solve this problem, a back light is arranged on a reflective mold liquid crystal display, and the transflective reflective mold liquid crystal display of the format of making this back light turning on in the dark place where outdoor daylight is not obtained, and performing a transparency display is known. However, in order to pass the reflective film which consists the light of a back light of a metal thin film in this kind of transflective reflective mold liquid crystal display and to use for a display, it was difficult to reconcile the brightness of a transparency display and a reflective display.
[0006] Then, outgoing radiation of the light from the light sources, such as LED introduced from the side edge side (light entering surface) of a light guide plate, is carried out from the whole surface of a light guide plate, and the reflective mold liquid crystal display equipped with the field-like lighting system (front light) which illuminates a reflective mold liquid crystal display unit from a front face is developed. Thus, by arranging a front light on the front face of a liquid crystal display, even if it is a dark place, the same reflective display as the case where outdoor daylight is used is attained.
[0007] Drawing 19 is the perspective view showing an example of the liquid crystal display which equipped the front face of a liquid crystal display unit with the front light, and drawing 20 is the cross-section structure schematic drawing of the front light part shown in drawing 19 . As shown in these drawings, the liquid crystal display 110 consists of a front light (field-like lighting system) 111 and a liquid crystal display unit 112, and the outline configuration of the front light 111 is carried out from luminescence equipment E equipped with the LED light emitting device attached in the both ends of the light guide plate 113 which consists of transparent acrylic resin etc., the transparent material 114 of the shape of a bar arranged in the side edge side, and this transparent material 114. Moreover, as shown in drawing 20 , prism side 114a which consists of two or more concave heights of three square shapes is formed in the field of the light guide plate 113 side of a transparent material 114, and the opposite side, and it is constituted so that the light by which outgoing radiation was carried out from luminescence equipment B can be led to a light guide plate 113 side in this prism side 114a.
[0008] In the front light 111 of the structure shown in drawing 19 and drawing 20 , since it has structure which is made to reflect the outgoing radiation light from luminescence equipment B by prism side 114a of a transparent material 114, and introduces light into a light guide plate 113 side, it is necessary to irradiate as mostly as possible the light by which outgoing radiation was carried out from luminescence equipment B to the prism side 114a side, as shown in drawing 20 . To however, eye backlash it is [eye] only that only a part goes in the direction of a right angle from the substrate 100 of luminescence equipment B among the light by which outgoing radiation was carried out in all the directions from the light emitting device 105 of luminescence equipment B as explained previously Outgoing radiation was carried out to the longitudinal

direction from the light emitting device 105, and also the light to a direction does not tend to be used effectively, and raised the utilization factor of the light from the light emitting device 105 of luminescence equipment E, and there was a demand of wanting to make brightness of a front light 111 still higher.

[0009] This invention is made in order to solve the above-mentioned technical problem, and it aims at offer of the field-like lighting system which could be made to perform bright lighting as was able to use efficiently the light sent from the light emitting device. As it is made in order that this invention may solve the above-mentioned technical problem, and the light sent from the light emitting device can be used efficiently, while being able to perform bright lighting, the structure of the attachment object equipped with the wall equipped with the light reflex section and the leadframe is simplified, and it aims at offering the field-like lighting system it enabled it to manufacture simple. It is made in order that this invention may solve the above-mentioned technical problem, and it aims at offering the liquid crystal display which enabled the bright display as could draw as many light in the specific direction of luminescence equipment by which outgoing radiation was carried out from the light emitting device as possible.

[0010]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention adopted the following configurations. The field-like lighting system of this invention comes to provide the transparent material which equipped the edge with luminescence equipment, and the light guide plate connected to this transparent material. The light by which outgoing radiation was carried out is led to a light guide plate through said transparent material from said luminescence equipment. It is the field-like lighting system which carries out outgoing radiation from the outgoing radiation side of this light guide plate. Said luminescence equipment Estrange mutually and the leadframe by the side of a positive electrode and a negative electrode is attached in the attachment object which has a pars basilaris ossis occipitalis and a wall so that it may touch separately at said pars basilaris ossis occipitalis. A light emitting device is attached in one leadframe, and one electrode of this light emitting device is connected electrically. While the electrode of another side of said light emitting device is electrically connected to the leadframe of another side, it is characterized by having the configuration in which it comes to form in said attachment object upper part the lens section which condenses the light by which outgoing radiation was carried out from said light emitting device. Since the light by which outgoing radiation was carried out from the light emitting device can be condensed in the lens section, the use effectiveness of the light which the light emitting device emitted improves, and a bright field-like lighting system can be offered. Moreover, since a light emitting device is attached in the leadframe attached in the attachment object, the attachment reinforcement of a light emitting device can also be raised.

[0011] The field-like lighting system concerning this invention is characterized by an inclined plane being formed in the field by the side of said light emitting device of said wall, and coming to form the light reflex section in this inclined plane. Since it is reflected in the inclined plane of a wall and a part of light by which outgoing radiation was carried out to it being the structure where the inclined plane is formed in the wall in the longitudinal direction from the light emitting device goes to the pars-basilaris-ossis-occipitalis bottom, the light by which outgoing radiation was carried out in the various directions from the light emitting device can be collected as much as possible in an one direction, for example, the direction which intersects perpendicularly with the pars basilaris ossis occipitalis of an attachment object, and separates from a pars basilaris ossis occipitalis, and can carry out outgoing radiation.

[0012] It is characterized by the attachment object which has said pars basilaris ossis occipitalis and wall enclosing said a part of leadframe, and really coming to fabricate the field-like lighting system of this invention with resin. Since a leadframe is firmly positioned to an attachment object and a light emitting device is fixed to this leadframe when the attachment object by shaping resin is really unified to the leadframe, positioning and immobilization of a light emitting device to an attachment object are made certainly.

[0013] The field-like lighting system of this invention comes to provide the transparent material which equipped the edge with luminescence equipment, and the light guide plate connected to

this transparent material. The light by which outgoing radiation was carried out is led to a light guide plate through said transparent material from said luminescence equipment. It is the field-like lighting system which carries out outgoing radiation from the outgoing radiation side of this light guide plate. Said luminescence equipment Estrange mutually and the leadframe by the side of a positive electrode and a negative electrode is attached in the attachment object which has a pars basilaris ossis occipitalis and a wall so that it may touch separately at said pars basilaris ossis occipitalis. A light emitting device is attached in one leadframe, and one electrode of this light emitting device is connected electrically. While the electrode of another side of said light emitting device is electrically connected to the leadframe of another side, the field by the side of said light emitting device of said wall is made into an inclined plane, and it has the configuration in which it comes to form in this inclined plane the light reflex section which reflects the light by which outgoing radiation was carried out from said light emitting device.

[0014] The light emitting device installed on the leadframe on an attachment object pars basilaris ossis occipitalis irradiates light towards the various directions not only of the top direction of a pars basilaris ossis occipitalis but a perimeter. Although the light by which outgoing radiation was carried out in the top direction of a pars basilaris ossis occipitalis was easy to be used effectively, the light by which outgoing radiation was carried out to the direction in alignment with the pars basilaris ossis occipitalis of an attachment object, i.e., a longitudinal direction, was not effectively used with conventional luminescence equipment. On the other hand, since it is reflected in the inclined plane of a wall and a part of light by which outgoing radiation was carried out to it being the structure where the inclined plane is formed in the wall in the longitudinal direction from the light emitting device goes to the pars-basilaris-ossis-occipitalis bottom, the light by which outgoing radiation was carried out in the various directions from the light emitting device can be collected as much as possible in an one direction, for example, the direction which intersects perpendicularly with the pars basilaris ossis occipitalis of an attachment object, and separates from a pars basilaris ossis occipitalis, and can carry out outgoing radiation. Therefore, the brightness as a field-like lighting system can be raised. Moreover, since a light emitting device is attached in the leadframe attached in the attachment object, the attachment reinforcement of a light emitting device can also be raised.

[0015] The field-like lighting system of this invention comes to provide the transparent material which equipped the edge with luminescence equipment, and the light guide plate connected to this transparent material. The light by which outgoing radiation was carried out is led to a light guide plate through said transparent material from said luminescence equipment. It is the field-like lighting system which carries out outgoing radiation from the outgoing radiation side of this light guide plate. Said luminescence equipment Estrange mutually and the leadframe by the side of a positive electrode and a negative electrode is attached in the attachment object which has a pars basilaris ossis occipitalis and a wall so that it may touch separately at said pars basilaris ossis occipitalis. While a light emitting device is attached in one leadframe and one electrode of this light emitting device is connected electrically While the electrode of another side of said light emitting device is electrically connected to the leadframe of another side It comes to form the light reflex section which reflects the light by which the field by the side of said light emitting device of said wall was made into the inclined plane, and outgoing radiation was carried out to this inclined plane from said light emitting device. It is characterized by having the configuration with which the attachment object which has said pars basilaris ossis occipitalis and wall encloses said a part of leadframe, and it really comes to fabricate it with resin.

[0016] The light emitting device installed on the leadframe on an attachment object pars basilaris ossis occipitalis irradiates light towards the various directions not only of the top direction of a pars basilaris ossis occipitalis but a perimeter. Although the light by which outgoing radiation was carried out in the top direction of a pars basilaris ossis occipitalis was easy to be used effectively, the light by which outgoing radiation was carried out to the direction in alignment with the pars basilaris ossis occipitalis of an attachment object, i.e., a longitudinal direction, was not effectively used with conventional luminescence equipment. On the other hand, since it is reflected in the inclined plane of a wall and a part of light by which outgoing radiation was carried out to it being the structure where the inclined plane is formed in the wall in the longitudinal

direction from the light emitting device goes to the pars-basilaris-ossis-occipitalis bottom, the light by which outgoing radiation was carried out in the various directions from the light emitting device can be collected as much as possible in an one direction, for example, the direction which intersects perpendicularly with the pars basilaris ossis occipitalis of an attachment object, and separates from a pars basilaris ossis occipitalis, and can carry out outgoing radiation. Therefore, the brightness as a field-like lighting system can be raised. And if the light reflex section is formed in the inclined plane, since light will be further reflected strongly by this light reflex section, as a result of being able to condense strongly the light by which outgoing radiation was carried out in the various directions from the light emitting device to an one direction, the field-like lighting system which raised brightness further can be offered. Furthermore, since a leadframe is firmly positioned to an attachment object and a light emitting device is fixed to this leadframe when the attachment object by shaping resin is really unified to the leadframe, positioning and immobilization of a light emitting device to an attachment object are made certainly.

[0017] The field-like lighting system of this invention is characterized by a transparence resin layer being formed in the part divided by said pars basilaris ossis occipitalis and said wall, and a lens member being joined on this transparence resin layer, and coming to constitute the lens section. Since the light by which outgoing radiation was carried out from the light emitting device also in the structure where the lens member was prepared on the transparence resin layer can be condensed in the lens section, the use effectiveness of the light which the light emitting device emitted improves, and a bright field-like lighting system can be offered. Moreover, lens processing of a transparence resin layer becomes unnecessary, and can constitute the lens section from attaching the lens member by which lens processing is carried out beforehand separately as another object on a transparence resin layer easily.

[0018] The field-like lighting system of this invention is characterized by coming to form the light reflex section in the pars-basilaris-ossis-occipitalis top of said attachment object, or the apical surface of a wall. By the light reflex section being formed on the pars basilaris ossis occipitalis of an attachment object, even if it is the light by which outgoing radiation was carried out towards the attachment object pars-basilaris-ossis-occipitalis side from the light emitting device, it can be made to be able to reflect in the light reflex section of an attachment object pars basilaris ossis occipitalis, the outgoing radiation of the light can be made to be able to carry out in the direction which separates from an attachment object pars basilaris ossis occipitalis, and the brightness as a field-like lighting system can be raised more. Moreover, also by forming the light reflex section on the apical surface of a wall, the reflective effectiveness of light can improve and the brightness as a field-like lighting system can be raised more.

[0019] As for the field-like lighting system of this invention, said light reflex section is characterized by consisting of the aggregate or fluorescent paint of a metal powder of light reflex nature, such as silver dust, gold dust, and aluminium powder. If it is the light reflex section which consists of these metal powders, light can be reflected with a high reflection factor and brightness can be raised more. Moreover, brightness can be improved even if it consists of fluorescent paint as the light reflex section.

[0020] The field-like lighting system of this invention is the structure where the light emitting device was installed on the pars basilaris ossis occipitalis of said attachment object. The horizontal distance from the core of this light emitting device to the upper limit section of the inclined plane of said wall is assumed to be X1. When assume the wall height from the top face of a pars basilaris ossis occipitalis to the upper limit section of a wall to be Hwall, the lens section maximum thickness from the top face of a pars basilaris ossis occipitalis to the upper limit center section of the lens section is assumed to be H1, the height of a light emitting device is assumed to be H and the curvature of the lens section is set to Rlens, it is characterized by satisfying the relation of the following formulas.

$|Rlens-\{(H1-Hwall)^2+X12\} / 2(H1-Hwall)|<0.5$ -- condensing effectiveness can be raised by satisfying this formula, and a bright field-like lighting system can be offered.

[0021] The field-like lighting system of this invention is the structure where the light emitting device was installed on the pars basilaris ossis occipitalis of said attachment object. The inclined

plane of said wall is formed in the shape of a curved surface, and assumes the horizontal distance from the core of this light emitting device to the upper limit section of the inclined plane of said wall to be X1. When the wall height from the top face of a pars basilaris ossis occipitalis to the upper limit section of a wall is assumed to be Hwall and the inclination condition of said inclined plane is set to Rwall, it is characterized by satisfying the relation of the following formulas.

| Rwall-{(X1-X0) 2+Hwall2}/2(X1-X0) |<0.5 -- condensing effectiveness can be raised by satisfying this formula, and a bright field-like lighting system can be offered.

[0022] The field-like lighting system of this invention is the structure where the light emitting device was installed on the pars basilaris ossis occipitalis of said attachment object, and when the inclined plane of said wall is formed in the shape of a curved surface, assumes the wall height from the top face of said pars basilaris ossis occipitalis to the upper limit section of a wall to be Hwall and assumes the height of a light emitting device to be H, it is characterized by satisfying the relation of the following formulas.

{(Hwall-H)/(X1-X)}-1/21/2|<0.4 -- condensing effectiveness can be raised by satisfying this formula, and a bright field-like lighting system can be offered.

[0023] The liquid crystal display of this invention is characterized by having mated the field-like lighting system of a publication with the liquid crystal display unit, and forming it in either of previous. If it is the liquid crystal display previously equipped with the field-like lighting system of the various structures of a publication, it is possible to use effectively the light which carried out outgoing radiation from luminescence equipment, and the liquid crystal display of a bright high display of efficiency for light utilization can be offered.

[0024]

[Embodiment of the Invention] Hereafter, although the gestalt of operation of this invention is explained with reference to a drawing, this invention is not limited to the gestalt of the following operations. Drawing 1 is the perspective view showing the liquid crystal display L whole configuration equipped with the front light (field-like lighting system) concerning this invention, drawing 2 is the partial mimetic diagram of a front light, and drawing 3 is the partial type section Fig. of a liquid crystal display unit and a front light. The outline configuration of the liquid crystal display L shown in drawing 1 is carried out from the liquid crystal display unit (liquid crystal panel) 50 and the front light (field-like lighting system) 51 arranged on the top-face side. The outline configuration of the front light 51 of this gestalt is carried out from the rectangle-like light guide plate 52 and light equipment 53. Moreover, as shown in drawing 3 , the liquid crystal display unit 50 side (inferior-surface-of-tongue side) of a light guide plate 52 is set to outgoing radiation side 52b to which it considers as a flat side and outgoing radiation of the illumination light is carried out.

[0025] In said light guide plate 52, to the outgoing radiation side 52b and opposed face (top face) 52c side which is the field of the opposite side As cross-section structure is shown in drawing 3 , two or more slots 54 which consist of gentle slope section 54a formed by inclining to outgoing radiation side 52b and steep incline section 54b which is formed following this gentle slope section 54a, and has whenever [more sudden than gentle slope section 54a tilt-angle] are formed at spacing fixed in the shape of a stripe. And while the tilt angle to outgoing radiation side 52of gentle slope section 54a and steep incline section 54b b which constitutes two or more slots 54 formed in opposed face 52c in the shape of a stripe is made it is desirable and the same in all the slots 54, the die-length direction of these slots 54 is arranged so that it may become parallel to the shorter side of a light guide plate 52.

[0026] Said light source 53 consists of two luminescence equipments C arranged in the both ends of transparent material 53A [being cylindrical (the shape of the square pole)] arranged at the sense parallel to the direction of the slot 54 on previous as shown in drawing 1 , and this transparent material 53A. The light source 53 of this gestalt is made into the structure which changes and has the propagation direction of light by optical-path modification side (prism side) 53a of the cross-section triangular irregularity mold which introduced into the interior of transparent material 53A the light by which outgoing radiation was carried out from the luminescence equipment C arranged on both ends, and was formed in the field of a light guide

plate 52 and the opposite side in this transparent material 53A, and can supply light to a light guide plate 52.

[0027] Although the aforementioned light guide plate 52 consists of transparent resin ingredients of 90% or more of light transmittance preferably and transparent resin ingredients, such as polycarbonate system resin besides acrylic resin and an epoxy resin, can be used for it, its translucent rate is large and it is desirable to use the ingredient which a birefringence cannot produce easily. Although it is not especially limited if a concrete example is given, ATON (trade name: Japan Synthetic Rubber Co., Ltd. make), ZEONOA (trade name: Nippon Zeon Co., Ltd. make), etc. can be mentioned as a suitable thing.

[0028] On the other hand, as shown in drawing 4 R> 4, the liquid crystal display unit 50 carries out the junction unification of the 1st substrate 61 and 2nd substrate 62 which consist of glass which pinches the liquid crystal layer 63 and counters, resin, etc. by the sealant 64, and is constituted. The laminating of the reflecting layer 65 which contains the metaled reflective film in the field by the side of the liquid crystal layer 63 of said 2nd substrate 62, and the display circuit 66 of transparence is carried out to order, and the display circuit 67 of transparence is formed in the field by the side of the liquid crystal layer 63 of said 1st substrate 61, respectively. Let the liquid crystal display unit 50 be the liquid crystal display unit of the reflective mold equipped with the reflecting layer 65 for reflecting the light by which incidence was carried out from the outside as mentioned above. In addition, although not illustrated by display circuits 66 and 67, the electrode layer which consists of transparence electric conduction film for driving the liquid crystal layer 63 etc. is formed, and the orientation film for controlling the orientation of the liquid crystal layer 63 etc. is formed on them at them. Moreover, although omitted in drawing 4 , the color filter for performing color display depending on the case etc. may be formed in the liquid crystal layer side rather than the reflecting layer 65 the liquid crystal layer side of a substrate 61, or on a substrate 62.

[0029] Next, a reflecting layer 65 forms the reflective film of the metal which consists of aluminum, silver, etc. by a spatter etc. on the organic film which consists of acrylic resin with which the shape of toothing was formed in the front face, forms the flattening film which consists of acrylic resin etc. so that this reflective film and the organic film may be covered, and is constituted. In the structure of this gestalt, a reflecting layer 65 is good also as a configuration containing a color filter, and it is desirable to form a color filter in right above [of said reflective film] in that case. If it considers as such a configuration, since a color filter can be arranged to the reflector of light, a color gap and parallax are reduced and high-definition color display is possible.

[0030] The liquid crystal display L of the above configuration can be displayed by making the front light 51 besides using a solar light or the external illumination light a reflective display turn on, and reflecting the light by the above-mentioned reflecting layer 65. The light guide plate 52 of a front light 51 is arranged at the top-face side of the viewing area of the liquid crystal display unit 50. The light introduced into the light guide plate 52 through light entering surface 52a of a light guide plate 52 from the light source 53 of a front light 51 While spreading the interior of a light guide plate 52, a direction can be changed into the side which is reflected by steep incline section 54b of two or more slots 54 formed in opposed face 52c of a light guide plate 52, and goes to outgoing radiation side 52b, outgoing radiation is carried out from outgoing radiation side 52b of a light guide plate 52, and the liquid crystal display unit 50 is illuminated. The light which carried out incidence to the liquid crystal display unit 50 passes the display circuit 67 of the liquid crystal display unit 50, the liquid crystal layer 63, and a display circuit 66, and a reflecting layer 65 is reached, it is reflected by the reflective film of this reflecting layer 65, it passes the light guide plate 52 of return and transparence to the outside of the liquid crystal display unit 50, and outgoing radiation is carried out from opposed face 52c, and it reaches a user. Thus, the display of the liquid crystal display unit 50 is checked by looking by the user.

[0031] The liquid crystal display L of this operation gestalt which displays by the above-mentioned actuation can obtain the reflective display which used outdoor daylight and used the reflecting layer 65 like the outdoors or the office under a fluorescent lamp, without carrying out outgoing radiation of the light from luminescence equipment C in a bright location. That is, it is

reflected by the reflecting layer 65 after passing a substrate 61, a display circuit 67, the liquid crystal layer 63, and a display circuit 66, and the outdoor daylight by which passed the light guide plate 52 of transparence and incidence was carried out to the liquid crystal display unit 50 passes a display circuit 66, the liquid crystal layer 63, a display circuit 67, a substrate 61, and a light guide plate 52 again, results in a user (observer) and is checked by looking. And the permeability of light can be partially changed by carrying out orientation control of the liquid crystal molecule in the liquid crystal layer 63 by display circuits 66 and 67 in this case, and the display of the purpose can be obtained.

[0032] Moreover, in using the liquid crystal display L of this gestalt in a dark place or Nighttime, luminescence equipment C is operated and it uses it with illuminating a liquid crystal panel with the light from luminescence equipment C. As shown in drawing 2 R> 2, it is reflected in light guide section 53a of a triangular irregularity mold, after the light by which outgoing radiation was carried out from luminescence equipment C has an optical path changed, it is led to a light guide plate 52 side, and as further shown in drawing 3 , in steep incline section 54b--, it is reflected downward, and, finally it illuminates the liquid crystal display unit 50. Moreover, although it is reflected also in gentle slope section 54a and light which reached gentle slope section 54a-- in the light by which incidence was carried out to the light guide plate 52 is made into facing down Whenever [over outgoing radiation side 52b of a light guide plate 52 / incident angle] is reflected in outgoing radiation side 52b from shallow relation, and this light spreads the interior of a light guide plate 52 again. While repeating this propagation, it places upside down the light guide of what reached steep incline section 54a, and outgoing radiation is carried out to the liquid crystal display unit 50 side from outgoing radiation side 52b, and, finally it illuminates the liquid crystal display unit 50.

[0033] Although the liquid crystal display unit 50 can be illuminated with the light by which outgoing radiation was carried out as mentioned above from luminescence equipment C, since the luminescence equipment C explained below in the gestalt of this operation is used, from conventional luminescence equipment, a nearby light many is made to irradiate the liquid crystal display unit 50 side, and a brighter liquid crystal display can be obtained.

[0034] Below, an example of the luminescence equipment C concerning this invention is explained here at a detail. Drawing 5 - drawing 7 show the gestalt of operation of the 1st of the luminescence equipment concerning this invention, and the luminescence equipment C of this gestalt is constituted in preparation for the interior of the attachment object 2 of the core box made from resin one which consists of a white epoxy resin etc. in the light emitting device 1 which consists of a semiconductor chip. Said attachment object 2 is formed in wall 2B mostly set up by the right angle to pars-basilaris-ossis-occipitalis 2A at the four periphery sections of tabular plane view rectangle-like pars-basilaris-ossis-occipitalis 2A and this pars-basilaris-ossis-occipitalis 2A, 2C, 2D, and box-like [that consist of 2E]. While wall 2B and 2D are formed in the long side side of pars-basilaris-ossis-occipitalis 2A among previous wall 2B, 2C, 2D, and 2E, Walls 2C and 2E are formed in the shorter side side of pars-basilaris-ossis-occipitalis 2A and the top-face side of the attachment object 2 is used as opening Inclined plane (for example, inclined plane of sense which is thick in pars-basilaris-ossis-occipitalis 2A side of wall 2C, and makes thin upper limit side of wall 2C) 2F of slanting facing up are formed in the field by the side of pars-basilaris-ossis-occipitalis 2A among Walls 2C and 2E.

[0035] moreover, the case where whenever [this tilt-angle / of inclined plane 2F] forms a plane reflector from inclined plane 2F -- as whenever [tilt-angle] (standup include angle of inclined plane 2F to pars-basilaris-ossis-occipitalis 2A) -- the range of 40-70 degrees -- 55 degrees is more preferably desirable. In addition, when making inclined plane 2F into a curved surface in consideration of improvement in the further light reflex nature, it is desirable to consider as the curved surface shown in the relational expression mentioned later. In addition, although drawing 6 showed inclined plane 2F of right and left as the same include angle, inclined plane 2F of the walls 2C and 2E on either side may be whenever [different tilt-angle]. As for the case where a light emitting device 1 is installed in the center section of pars-basilaris-ossis-occipitalis 2A, whenever [tilt-angle / of inclined plane 2F of right and left] is equal, and as shown in drawing 6 , when the light emitting device 1 is installed in left-hand side (side near wall 2E) a little rather

than the center section of pars-basilaris-ossis-occipitalis 2A, it is desirable that whenever [tilt-angle / of inclined plane 2F of wall 2C] is equal to whenever [tilt-angle / of wall 2E]. In addition, about the reason the light emitting device 1 is installed in the left-hand side [center section] twist in drawing 2 , it mentions later again.

[0036] Next, the end face section of one wall 2E of the walls 2C and 2E (drawing 5 and drawing 6 left wall 2E) is penetrated, a leadframe 5 is attached, the end face section of wall 2C (drawing 6 drawing 5 , wall 2C of the method of the right) of another side is penetrated, a leadframe 6 is attached, and leadframes 5 and 6 are united with the attachment object 2. The previous leadframe 5 consists of desirable metal plates of right conductivity, such as copper. Fixed part 5A of the shape of a plane view square of magnitude which occupies left-hand side one half extent of pars-basilaris-ossis-occipitalis 2A which considers as the plane view abbreviation mold configuration for L characters as a whole as an expansion condition as shown in drawing 8 , and is shown in drawing 5 , It consists of connection 5D installed in connection 5C installed in narrow connection 5B and this connection 5B of width of face by the right angle rather than this fixed part 5A, and this connection 5C by the right angle. And this leadframe 5 inserts the part of fixed part 5A, and a part of connection 5B following fixed part 5A in slot 2G formed in the pars-basilaris-ossis-occipitalis 2A top face of said attachment object 2. As wall 2E of the attachment object 2 is penetrated by connection 5B, a part of connection 5B projected on the outside of wall 2C is bent along with the bend line shown with 5f of signs to drawing 8 and it is shown in the external surface of wall 2E at drawing 7 , while mating As it bends further along with 5g of bend lines which show a part of connection 5C to drawing 8 and is shown in drawing 7 , it unites with the attachment object 2 in the form mated with the external surface of wall 2D, and let connection 5D be one electrode for external connection as luminescence equipment C.

[0037] Moreover, the leadframe 6 of another side consists of desirable metal plates of right conductivity, such as copper, and is made into the L character mold configuration except fixed part 5A, i.e., the abbreviation mold configuration for L characters which consists of connections 6B, 6C, and 6D as shown in the development view of drawing 9 , from the leadframe 5 of the point shown in the development view of drawing 8 . Moreover, while a leadframe 6 inserts the part of connection 6B in slot 2H formed in the pars-basilaris-ossis-occipitalis 2A top face of said attachment object 2 and penetrating wall 2C of the attachment object 2 by connection 6B Along with 6f of bend lines shown in drawing 9 , bend a part of connection 6B projected besides wall 2C, and it is mated with the external surface of wall 2C of another side. A part of connection 6C is bent along with 6g of bend lines shown in drawing 9 , as shown in drawing 7 , the attachment object 2 unites with the external surface of wall 2D of the attachment object 2 in the form where connection 6D is mated, and let connection 6D be the electrode for external connection of another side as luminescence equipment C. Therefore, it estranges right and left and electrode 5D for connection as luminescence equipment C and electrode 6D for connection are formed in the external surface side of wall 2D of the attachment object 2. In addition, although it is indicated that each leadframes 5 and 6 are not bent in drawing 5 and 6, since it is used in the form bent as actual structure was shown in drawing 7 , the condition before carrying out bending of the leadframes 5 and 6 in drawing 5 and drawing 6 is shown.

[0038] In the previous leadframe 5 fixed part 5A It considers as the magnitude which occupies the left-hand side of pars-basilaris-ossis-occipitalis 2A most from the center section of pars-basilaris-ossis-occipitalis 2A as shown in drawing 5 and drawing 6 . In the leadframe 6, the point of connection 6B is arranged in the location which projects a little from the wall 2C side by narrow rather than previous fixed part 5A, and where the point of a leadframe 5 and the point of a leadframe 6 are estranged, contiguity arrangement is carried out on pars-basilaris-ossis-occipitalis 2A. Moreover, the previous attachment object 2 is formed with the one moldings of resin so that it may mention later, and with this operation gestalt, by really fabricating resin, the perimeter of leadframes 5 and 6 unites with leadframes 5 and 6, and it is formed in it. Moreover, since the fixed part side of a leadframe 5 is inserted in slot 2G of the attachment object 2 Since fixed part 5A of a leadframe 5 is arranged so that it may become flat-tapped with the top face of attachment object pars-basilaris-ossis-occipitalis 2A, and connection 6B of a leadframe 6 is inserted in slot 2H of the attachment object 2 Connection 6B of a leadframe 6 is arranged so

that it may become flat-tapped with the top face of attachment object pars-basilaris-ossis-occipitalis 2A, and the top face of pars-basilaris-ossis-occipitalis 2A of the attachment object 2 is located in the part between leadframes 5 and 6.
[0039] Next, on fixed part 5A of a leadframe 5, the light emitting device 1 of the shape of a chip which consists of semi-conductor substrates, such as ZnSe, is fixed by die bonding through the lower electrode layer 14 by the side of the below-mentioned negative electrode formed in the pars basilaris ossis occipitalis, and while lead wire 8 is connected to the below-mentioned electrode 13 by the side of the positive electrode formed in the upper part of a light emitting device 1 by wirebonding, this lead wire 8 is connected to connection 6B of a leadframe 6. Although the light emitting device 1 is being fixed by die bonding on fixed part 5A of a leadframe 5 here The light emitting device 1 is being fixed to the wall 2E side on the left-hand side of left-hand side, i.e., drawing 5 , or drawing 6 a little from the center section of pars-basilaris-ossis-occipitalis 2A, as shown in drawing 5 . On the other hand, a paraphrase forms the connection part of the lead wire 8 of a leadframe 6 in the center section of the field of the right-hand side one half of pars-basilaris-ossis-occipitalis 2A shown in drawing 5 and drawing 6 , and the location distant from wall 2C on the right-hand side of drawing 5 and drawing 6 a little.
[0040] As lead wire 8 shows drawing 5 here, it is the location distant from wall 2C a little, and when the luminescence equipment C of this operation gestalt is the minute components which are the breadth of 2mm, and the dip of about 1mm, it is being fixed to the tip side of connection 6B by wirebonding because the allowances cost of the migration width of face of wirebonding equipment in case wirebonding equipment carries out wirebonding of the lead wire to the top face of connection 6B is required. That moreover, the light emitting device 1 is attached in the wall 2E side (left-hand side of drawing 5) rather than the center section of pars-basilaris-ossis-occipitalis 2A of the attachment object 2 In order to connect by wirebonding generally If it thinks that the distance for giving the suitable curve of extent it is made not to make lead wire 8 bend, and making connection possible is required, and the end of lead wire 8 is connected to the point of a leadframe 6 like the point It is from the relation which it is necessary to make estrange fixed part 5A of a leadframe 5 the tip of a leadframe 6, and a little, and needs to arrange it as a location which can do the other end of lead wire 8 by wirebonding as connection is possible. Moreover, when a light emitting device 1 is grasped with the robot hand for die bondings, or the fixture for grasping and it carries out die bonding of this to fixed part 5A, spacing of a light emitting device 1 and wall 2E is opened, because the space for the migration tooth spaces of a robot hand or the fixture for grasping is needed so that a robot hand or the fixture for grasping, and wall 2E may not interfere.
[0041] from relation with the mutual constraint on the handling of these wirebonding and a light emitting device 1, as the location of fixed part 5A, the die bonding location of a light emitting device 1, and the wirebonding location of lead wire 8 show drawing 5 , arrangement ****** do not restrict these attaching positions at all in this invention. Furthermore, since inclined plane 2F are formed in wall 2C and wall 2E and width of face (opening width of face) by the side of the upper limit section (point) of Walls 2C and 2E is made larger than the width of face (opening width of face) by the side of the end face section (pars basilaris ossis occipitalis) of Walls 2C and 2E The large space tooth space or large allowances cost at the time of a previous robot hand or the point of the fixture for grasping grasping a light emitting device 1, and attaching on pars-basilaris-ossis-occipitalis 2A can be taken, and migration of a robot hand or the fixture for grasping can be performed easily.
[0042] Next, the inside, a light emitting device 1, lead wire 8, etc. of these walls are covered to the field surrounded by pars-basilaris-ossis-occipitalis 2A of the attachment object 2, and wall 2B, 2C, 2D and 2E, it is filled up with transparent materials, such as transparence resin, the upper part of this transparent material is processed on it in the shape of a convex surface, and the lens section 9 is formed in it. [when forming this lens section 9] Pars-basilaris-ossis-occipitalis 2A and wall 2B of the attachment object 2, After being filled up with resin so that 2C, 2D, and the field surrounded by 2E may be covered, On this resin, may stick a transparence lens member as another object, may form it, and It may be filled up so that a transparence resin ingredient may be risen to that top in addition to the field surrounded by pars-basilaris-ossis-

occipitalis 2A of the attachment object 2, and wall 2B, 2C, 2D and 2E, and this resin layer may be ground after hardening by heat treatment of a cure etc., and the lens section 9 may be constituted. Moreover, the lens object equivalent to filled resin made from a resin ingredient may be stuck as another object, and the approach of uniting with restoration resin and a lens object by heat treatment at the time of a cure may be used. furthermore, the walls 2C and 2E of the attachment object 2 -- each -- light reflex layer (light reflex section) 2J are formed in inclined plane 2F. These light reflex layer 2J are formed by the approach of imprinting a light reflex layer in the manufacture approach which applies the coating of light reflex nature to each inclined plane of Walls 2C and 2E, applies the particle of light reflex nature, or is mentioned later.
[0043] What consisted of lower electrode layers 14 by which the laminating was carried out at the inferior-surface-of-tongue side of the previous substrate 10 is used for a p+-GaAs substrate or the p+-ZnSe substrate 10, the p-ZnSe layer 11 by which the laminating was carried out one by one on it, the up electrode layer 13, and a list so that said light emitting device 1 may show cross-section structure to the ZnSe mold semi-conductor widely known as an II-VI group compound semiconductor of the periodic table, for example, drawing 6 . In addition, although structure typical as a light emitting device 1 used here is the semiconductor device of the above-mentioned structure, of course, the light emitting device of other different structures from the structure shown in drawing 10 as the LED light emitting device generally known or other light emitting devices may be suitably used as a light emitting device of this invention.
[0044] The constituted luminescence equipment C can carry out outgoing radiation of the light from a light emitting device 1 like the above by impressing an electrical potential difference to a light emitting device 1 through the electrodes 5D and 6D for external connection. And the light emitting device 1 of this gestalt carries out outgoing radiation of the light in those the perimeter all directions from a light emitting device 1. That is, the slanting upper part or a lower part, the light that turns to the pars-basilaris-ossis-occipitalis 2A side further irradiate to an parallel direction, i.e., a sideways light, and pars-basilaris-ossis-occipitalis 2A to pars-basilaris-ossis-occipitalis 2A besides a light emitting device 1 carrying out outgoing radiation of the light in the direction left at a right angle to pars-basilaris-ossis-occipitalis 2A of the attachment object 2.
[0045] Since a light guide is carried out so that light reflex layer 2J toward which the walls 2C and 2E in which the part of such light was prepared around the light emitting device 1 inclined may reflect and it may be suitable in the direction of a right angle, or the direction near it to pars-basilaris-ossis-occipitalis 2A, the luminescence equipment C of this operation gestalt can irradiate a light stronger against the direction of a right angle over pars-basilaris-ossis-occipitalis 2A, or the direction near it than conventional luminescence equipment. Moreover, since light can be strongly reflected by the metal powder with these high reflection factors if light reflex layer 2J consist of metal powders etc., brighter luminescence equipment C can be obtained. Moreover, since the lens section 9 is formed in the outside of a light emitting device 1 with the gestalt of this operation, rather than conventional luminescence equipment, according to a condensing operation of the lens section, outgoing radiation of the still stronger light can be carried out in the direction of a right angle over pars-basilaris-ossis-occipitalis 2A, or the direction near it, and it can be provided with still brighter luminescence equipment C.
[0046] Next, although an arrow head S shows the direction of outgoing radiation of a suitable light in the gestalt of this operation to drawing 7 , since the width and side side is equipped with the electrodes 5D and 6D for connection as luminescence equipment C to this direction S of outgoing radiation, the side electrode structure which equipped the flank side of the direction of outgoing radiation of light with the polar zone is employable. If it is this side electrode structure, when the attachment object 2 serves as minute components like several mm angle, it will contribute to the improvement in workability of the wiring activity for connecting a power source to luminescence equipment C. Moreover, although the electrodes 5D and 6D for connection are made into the point side of leadframes 5 and 6 in previous explanation, it is good also considering connection 6B of the leadframe 6 good [as polar zone] and located [connection 5B of the leadframe 5 located in the exterior of wall 2E] in the exterior of wall 2C as polar zone. That is, with the luminescence equipment C of the gestalt of this operation, it considers as the configuration which is easy to choose positioning of the electrode for connection a wall 2D side

in both of the directions of a wall 2C side and the 2E side.
[0047] Next, in the luminescence equipment C of the gestalt of this operation, reflecting layer (reflective section) 2L may be formed in the pars-basilaris-ossis-occipitalis 2A top face of the attachment object 2. In that case, it is necessary to form reflecting layer 2L in the top face of pars-basilaris-ossis-occipitalis 2A of the attachment object 2 so that it may connect electrically and the points of leadframes 5 and 6 may not short-circuit. Therefore, when it constitutes a reflecting layer from fluorescent paint of electric insulation, the reflecting layer of fluorescent paint can be formed in all the top faces of pars-basilaris-ossis-occipitalis 2A, and when it constitutes a reflecting layer from a metal powder of light reflex nature, reflecting layer 2L will be formed so that a leadframe 5 and six comrades may not be short-circuited, and it may estrange the point side of a leadframe 5 and six comrades. By forming a reflecting layer on pars-basilaris-ossis-occipitalis 2A, the light by which outgoing radiation was carried out to the pars-basilaris-ossis-occipitalis 2A side from the light emitting device 1 can also be reflected, and it can be made to be able to go in the direction S of outgoing radiation, and can use effectively, and light by which outgoing radiation is carried out from luminescence equipment C can be strengthened more.
[0048] Next, in the luminescence equipment C of the gestalt of this operation, reflecting layer (reflective section) 2M can also be formed in apical surface 2K of wall 2B, 2C, 2D, and 2E. In this configuration, the brightness of luminescence equipment C can be raised further, using effectively reflecting layer 2M [of wall 2B, 2C, 2D, and 2E] of apical surface 2K.
[0049] Next, an example of an approach which manufactures the luminescence equipment C of structure explained with the gestalt of previous operation is explained below. In order to manufacture the luminescence equipment C of a previous gestalt, the metal mold 19 for resin shaping as shown in drawing 11 R> 1 is prepared first. This metal mold 19 consists of female mold 20 and a punch 21, as shown in drawing 11 . Cavity 20A which can fabricate pars-basilaris-ossis-occipitalis 2A of the previous attachment object 2 is formed in the upper part of female mold 20. Cavity 21A which can fabricate wall 2B of the previous attachment object 2, 2C, 2D, and 2E is formed in the lower part of a punch 21. Furthermore, that in which the gap (space) D which can put leadframes 5 and 6 between the boundary parts of female mold 20 and a punch 21 in the condition which shows in drawing 11 which doubled female mold 20 and a punch 21 is formed is desirable. In said metal mold 19, the slant surface part 23 is formed so that it may correspond to the part which can fabricate Walls 2C and 2E.
[0050] In order to manufacture luminescence equipment C using previous female mold 20 and a previous punch 21, first, as shown in drawing 11 , where leadframes 5 and 6 are put between Gap D, female mold 20 and a punch 21 are inserted in, and the cavities 20A and 20B for shaping are formed among both. In addition, in order to do easy the mold release activity of the Plastic solid after shaping, it is desirable to stick the exfoliation sheet 22 on the inferior-surface-of-tongue side of cavity 21A of a punch 21 here. Then, resin, such as a white epoxy resin, is poured in from the injected hole (it omitted in the drawing) of metal mold 19 to the cavities 20A and 21A for this shaping, and impregnation resin is stiffened in the shaping cavities 20A, 21A, and 21A around leadframes 5 and 6.
[0051] If the resin in metal mold hardens, the attachment object 2 with a leadframe which separates female mold 20 and a punch 21 and is shown in drawing 8 from metal mold will be released from mold. Since the mold release sheet 22 is arranged between the attachment object 2 and the metal mold inside in this mold release activity, the attachment object 2 can be easily removed from metal mold 19. And after releasing the attachment object 2 from mold from metal mold 19, reflecting layer 2J which the metal powder or fluorescent paint of light reflex nature, such as silver dust, gold dust, and aluminium powder, is made to adhere by approaches, such as the spraying method and the applying method, and are shown in drawing 13 are formed in the inclined planes 2F and 2F of the walls 2C and 2E of the attachment object 2. Moreover, as the metal powder or fluorescent paint of light reflex nature, such as silver dust, gold dust, and aluminium powder, is applied to extent which leadframes 5 and 6 do not connect with the top face of pars-basilaris-ossis-occipitalis 2A of the attachment object 2 too hastily by approaches, such as the spraying method, in addition to forming reflecting layer 2J in inclined planes 2F and

2F and it is shown in drawing 13 , reflecting layer (reflective section) 2L may be formed here. Furthermore, the metal powder or fluorescent paint of light reflex nature, such as silver dust, gold dust, and aluminium powder, may be applied to apical surface 2K of wall 2B of the attachment object 2, 2C, 2D, and 2E by approaches, such as the spraying method, and reflecting layer (reflective section) 2M may be separately formed on apical surface 2K. Moreover, in order to raise the light reflex nature of a leadframe 5 and 6 the very thing, the metal powder or fluorescent paint of light reflex nature, such as silver dust and gold dust, may be applied to leadframes 5 and 6 by approaches, such as the spraying method, a reflecting layer may be formed in a leadframe top face, and a leadframe 5 and 6 the very thing may be beforehand formed with the high metal of light reflex nature.

[0052] If reflecting layer 2J are formed in the attachment object 2, as shown in drawing 14 A, die bonding which joins a light emitting device 1 to fixed part 5A of a leadframe 5 is performed, the lower electrode 14 of a light emitting device 1 is electrically connected to attachment section 5A of a leadframe 5, subsequently wirebonding will be performed and the up electrode 13 and leadframe 6 of a light emitting device 1 will be electrically connected with lead wire 8.

[0053] Next, the part surrounded by pars-basilaris-ossis-occipitalis 2A of the attachment object 2, and wall 2B, 2C, 2D and 2E is filled up with transparence resin ingredients, such as potting resin, after carrying out heat curing of this transparence resin ingredient, that upper part is polished and the lens section 9 shown in drawing 14 A by the approach of processing it in the shape of a convex surface is formed. About the curved-surface configuration of this lens section 9, it is desirable that it is the relation explained with other operation gestalten mentioned later. In case this lens section 9 is formed, as shown in drawing 14 B, moreover, pars-basilaris-ossis-occipitalis 2A and wall 2B of the attachment object 2, After filling up 2C, 2D, and the part surrounded by 2E with transparence resin ingredients, such as potting resin, so that a restoration resin ingredient top face may become at the shape of a flat side, and setting them to transparence resin layer 9A at it, Lens member 9B made of transparence resin [finishing / processing in a lens mold] may be installed and heat-treated, and lens section 9C may be formed by the approach of welding both.

[0054] In addition, until it is and forms the lens section 9, after releasing a leadframe 5 and the attachment section 2 with six from mold from metal mold 20 and 21 Or polar-zone 5D for connection as shown in drawing 7 by mating and bending a part of leadframes 5 and 6 which bent and processed leadframes 5 and 6 in one after forming the lens section 9 of phases, and have been projected to the exterior of a Plastic solid to a Plastic solid, 6D can be formed.

[0055] Although the approach of bending and processing leadframes 5 and 6 after one shaping of the attachment object 2 over leadframes 5 and 6 in the gestalt of this operation was adopted, the configuration of metal mold is devised, it constitutes so that metal mold can be equipped with the leadframes 5 and 6 in the condition of having bent the part beforehand, and after equipping metal mold with the leadframes 5 and 6 in the condition of having bent the part, it can also unify with resin shaping. The luminescence equipment C of the structure shown in drawing 2 can be obtained by doing the activity by each process of explanation above.

[0056] If luminescence equipment C is manufactured by the manufacture approach of explanation above, leadframes 5 and 6 can be easily united with the attachment object 2, and luminescence equipment C can be manufactured. Moreover, since resin is poured into the perimeter of leadframes 5 and 6 and the attachment object 2 is fabricated, it can be made to be able to stick so that leadframes 5 and 6 may be embedded on the attachment object 2, and can fix firmly. Next, although outgoing radiation of the light is carried out to the perimeter omnidirection from a light emitting device 1 Since it is made to reflect upward by reflecting layer 2H of inclined plane 2D of the side-attachment-wall sections 2C and 2C and the light by which outgoing radiation was carried out to the right-and-left longitudinal direction from the light emitting device 1 is turned in the right-angled direction to pars-basilaris-ossis-occipitalis 2A of the attachment object 2 The light which the light emitting device 1 made emit light can be drawn in the direction of the purpose at effectiveness higher than conventional luminescence equipment. Therefore, the luminescence equipment C of this operation gestalt can make luminous efficiency good, and can offer brighter luminescence equipment C.

[0057] Moreover, compared with the case where pasted up like structure conventionally and it is manufacturing since leadframes 5 and 6 and the attachment object 2 could really be easily unified with shaping conventionally unlike structure as it is the approach of manufacturing with one shaping of the leadframes 5 and 6 by resin shaping explained previously, and the attachment object 2, and the thing of the condition that such bonding strength is moreover also high was obtained, luminescence equipment C can be formed very easily.
[0058] In addition, when convergent radiotherapy of the light needs to be carried out in the specific direction especially in the luminescence equipment C of the gestalt of this operation, it is desirable to constitute so that the include angle of inclined plane 2F of the attachment object 2 may be adjusted and the convergent radiotherapy of more light can be carried out towards the direction of the purpose. Moreover, when forming the lens section 9, it is desirable to constitute so that the radius of curvature of the lens section 9 may be adjusted and the convergent radiotherapy of much light can be carried out according to the direction of the purpose. Moreover, although the core of the radius of curvature of the lens section 9 has been arranged to the core side of the attachment object 2 with the gestalt of previous operation, the core of the radius of curvature of the lens section 9 is biased toward the wall 2E, i.e., attachment of light emitting device 1, side, and, of course, may be established.
[0059] In addition, since it is necessary to carry out convergent radiotherapy of much light by optical-path modification side 53a of a light guide section 53 when using luminescence equipment C as an object for the lighting of a liquid crystal panel 50 like the gestalt of this operation, it is desirable to constitute so that the include angle of inclined plane 2F of the attachment object 2 may be adjusted and the convergent radiotherapy of much light can be carried out by the optical-path modification side 53a side of a light guide section 53. Moreover, when forming the lens section 9, it is desirable to constitute so that the radius of curvature of the lens section 9 may be adjusted and the convergent radiotherapy of much light can be carried out by the optical-path modification side 53a side of a light guide section 53.
[0060] Drawing 15 shows the operation gestalt which processed the inclined plane of Walls 2C and 2E in the shape of a curved surface in the luminescence equipment C explained in the previous gestalt. Although attachment object 52G shown in drawing 15 are almost equivalent to the structure of a previous gestalt and it has pars-basilaris-ossis-occipitalis 52A and Walls 52C and 52E, it consists of inclined planes where the field by the side of the light emitting device 1 of Walls 52C and 52E curved. Drawing 16 is for explaining typically about the configurations of an attaching position and an inclined plane over the attachment object 52 of structure equivalent to the attachment object 2 of a light emitting device 1 explained in the previous gestalt. As shown in drawing 16 , it is the structure of providing pars-basilaris-ossis-occipitalis 52A of attachment object 52G, and Walls 52C and 52E, inclined plane 52F of the inside of wall 52C are a curved surface-like, and when formed in the shape of a secondary cross-section curve, it is desirable to consider as the configuration which agrees at following ceremony in consideration of the case where the top face of the lens section 59 is processed in the shape of a curved surface.
[0061] As shown in drawing 16 , it is assumed that the light emitting device 1 was installed in the top face of pars-basilaris-ossis-occipitalis 52A. The distance from the core of a light emitting device 1 to the Susono part of inclined plane 52F of wall 52C (part which inclined plane 52F connect to the top face of pars-basilaris-ossis-occipitalis 52A) is assumed to be X0. The horizontal distance from the core of a light emitting device 1 to the upper limit section of inclined plane 52F of wall 52C is assumed to be X1. The wall height from the top face of pars-basilaris-ossis-occipitalis 52A to the upper limit section of wall 52C is assumed to be Hwall. When the lens section thickness from the top face of pars-basilaris-ossis-occipitalis 52A to the upper limit center section of the lens section 59 is assumed to be H1, the height of a light emitting device 1 is assumed to be H and the curvature of the lens section is assumed to be Rlens, it is desirable to set up each value so that the relation of the following (1) types, (2) types, and (3) types may be satisfied.
[0062] first -- said -- a wall -- 52 -- C -- an inside -- an inclined plane -- 52 -- F -- a cross section -- two -- order -- a curve -- ** -- ** -- carrying out -- having -- a case -- an inclination -- a condition -- Rwall -- ** -- having carried out -- a case -- the following -- (--

one --) -- a formula -- being satisfied -- making -- things -- being desirable .
| Rwall-{(X1-X0) 2+Hwall2}/2(X1-X0) |<0.5 ... (1)
As for height (thickness) H of height Hwall of a formula and wall 52C, and a light emitting device 1, it is desirable to satisfy the following (2) types.
| {(Hwall-H)/(X1-X)}-1/21/2|<0.4 -- (2) When the curvature of a formula and the lens section is set to Rlens, it is desirable to satisfy the relation of the following (3) types.
| Rlens-{(H1-Hwall) 2+X12} / 2(H1-Hwall) |<0.5 ... (3) types [0063] In addition, as shown in drawing 15 in fact, a light emitting device 1 is formed in the location [center section / of pars-basilaris-ossis-occipitalis 52A of the attachment object 52 / top-face] shifted a little. Since the distance from a light emitting device 1 to right-hand side wall 52C differs from the distance from a light emitting device 1 to left-hand side wall 52E It is desirable to form the height of right-hand side wall 52C and the configuration of inclined plane 52F, and the height of left-hand side wall 52E and the configuration of inclined plane 52F so that it may differ separately using previous (1) - (3) type, and to raise the reflective effectiveness of light.
[0064] In addition, since it is necessary to carry out convergent radiotherapy of much light by optical-path modification side 53a of a light guide section 53 when using luminescence equipment C as an object for the lighting of a liquid crystal panel 50 like the gestalt of this operation, it is desirable to constitute so that the value of the above-mentioned (1) type may be adjusted for the include angle of inclined plane 2F of the attachment object 2, the inclination of an inclined plane may be adjusted and the convergent radiotherapy of much light can be carried out by the optical-path modification side 53a side of a light guide section 53. Moreover, when forming the lens section 9, it is desirable to adjust the curvature of the lens section 9, and to adjust the curvature of the lens section 9 based on previous (3) types so that the convergent radiotherapy of much light can be carried out by the optical-path modification side 53a side of a light guide section 53.
[0065]
[Example] The attachment object of the core box of the configuration shown in drawing 16 which consists of a white epoxy resin was cast, the ZnSe mold semi-conductor light emitting device which shows cross-section structure in drawing 1010 was installed in the base center section of this attachment object, while wiring so that it could energize, the transparence resin lens section was formed and luminescence equipment was manufactured so that the perimeter of a light emitting device might be covered. This luminescence equipment is used as luminescence equipment C of the front light (field-like lighting system) 51 shown in drawing 1 . When the electrical potential difference of 2.6V is impressed and is made to emit light to said light emitting device, the result of having measured the angle of beam spread (whenever [angle-of-divergence / of the flux of light]) of the light by which outgoing radiation is carried out from a light emitting device, and outgoing radiation is carried out from the lens section in the following conditions is shown in Table 1. Here, distance from the core of a light emitting device 1 to the Susono part of inclined plane 52F of wall 52C (part which inclined plane 52F connect to the top face of pars-basilaris-ossis-occipitalis 52A) is set to X0. The horizontal distance from the core of a light emitting device 1 to the upper limit section of inclined plane 52F of wall 52C is set to X1. Set distance from the core of a light emitting device 1 to the edge of a light emitting device 1 to X, and the wall height from the top face of pars-basilaris-ossis-occipitalis 52A to the upper limit section of wall 52C is set to Hwall. The wall height from the top face of pars-basilaris-ossis-occipitalis 52A to the upper limit center section of the lens section 59 is set to H1. Set the height of a light emitting device 1 to H, set the curvature of the lens section to Rlens, and the radius of curvature of inclined plane 52F is set to Rwall. As 0.2 and X0 are fixed to 0.65, Xone is fixed to each value of 1.05 for 0.2 and H and X is shown in Table 1 among these values, when each of other value is set up, the obtained angle of beam spread is measured.
[0066]
[Table 1]

H_{wall}	R_{wall}	R_{lens}	H1	(1)式左辺	(2)式左辺	(3)式左辺	指向角	備考
0.80	0.40	2.86	1.00	-0.60	0.00	0.00	121	(1)式範囲外
0.80	0.50	2.86	1.00	-0.50	0.00	0.00	101	(1)式範囲外
0.80	0.60	2.86	1.00	-0.40	0.00	0.00	80	
0.80	0.80	2.86	1.00	-0.20	0.00	0.00	59	
0.80	1.00	2.86	1.00	0.00	0.00	0.00	50	
0.80	1.20	2.86	1.00	0.20	0.00	0.00	57	
0.80	1.40	2.86	1.00	0.40	0.00	0.00	84	
0.80	1.50	2.86	1.00	0.50	0.00	0.00	100	(1)式範囲外
0.80	1.60	2.86	1.00	0.60	0.00	0.00	123	(1)式範囲外
0.46	0.46	2.86	0.46	0.00	-0.40	0.00	113	(2)式範囲外
0.55	0.58	2.86	0.58	0.00	-0.30	0.00	87	
0.63	0.70	2.86	0.70	0.00	-0.20	0.00	67	
0.72	0.85	2.86	0.85	0.00	-0.10	0.00	55	
0.80	1.00	2.86	1.00	0.00	0.00	0.00	50	
0.89	1.19	2.86	1.19	0.00	0.10	0.00	53	
0.97	1.38	2.86	1.38	0.00	0.20	0.00	65	
1.06	1.60	2.86	1.60	0.00	0.30	0.00	89	
1.14	1.82	2.86	1.82	0.00	0.40	0.00	115	(2)式範囲外
0.80	1.00	2.36	1.00	0.00	0.00	-0.50	105	(3)式範囲外
0.80	1.00	2.46	1.00	0.00	0.00	-0.40	85	
0.80	1.00	2.66	1.00	0.00	0.00	-0.20	62	
0.80	1.00	2.86	1.00	0.00	0.00	0.00	50	
0.80	1.00	3.06	1.00	0.00	0.00	0.20	61	
0.80	1.00	3.26	1.00	0.00	0.00	0.40	83	
0.80	1.00	3.36	1.00	0.00	0.00	0.50	106	(3)式範囲外

指向角100°未満を合格とした

[0067] As shown in Table 1, in this example, less than 100 degrees of angles of beam spread of the flux of light were judged to be success. If it is within the limits of (1) type when radius of curvature Rwall is made to fluctuate in 0.40-1.60 so that clearly from the result shown in Table 1, less than 100 degrees, the angle of beam spread of the flux of light can specifically be made into the range of 50-84 degrees, and can be judged to be more desirable in the field of condensing. If it is within the limits of (2) types when H1 is made to fluctuate Hwall, radius of curvature Rwall, and wall height so that clearly from the result shown in Table 1, less than 100 degrees, the angle of beam spread of the flux of light can specifically be made into the range of 50-89 degrees, and can be judged to be more desirable in the field of condensing. If it is within the limits of (3) types when H1 is set constant for Hwall, radius of curvature Rwall, and wall height and the curvature Rlens of the lens section is made to fluctuate to 2.36-3.36 so that clearly from the result shown in Table 1, less than 100 degrees, the angle of beam spread of the flux of light can specifically be made into the range of 50-85 degrees, and can be judged to be desirable in the field of condensing. If it is luminescence equipment which narrowed the angle of beam spread (whenever [angle-of-divergence / of the flux of light]) of light like the above, the light by which outgoing radiation was carried out from luminescence equipment can be drawn at a rate that it is efficient without futility and high to transparent material 53A, and the illumination intensity as a front light can be raised.

[0068]

[Effect of the Invention] Since the use effectiveness of the light which the light emitting device emitted since the field-like lighting system of this invention condensed and irradiated the light by which outgoing radiation was carried out in the lens section from the light emitting device can be raised as explained above, and much light can be irradiated from a light guide plate at the target irradiated object, a field-like lighting system brighter than before can be offered. Moreover, since a light emitting device is attached in the leadframe attached in the attachment object, the attachment reinforcement of a light emitting device can also be raised.

[0069] Since it is the structure which formed the inclined plane in the wall, the field-like lighting

system concerning this invention can reflect in a longitudinal direction a part of light by which outgoing radiation was carried out from a light emitting device in the inclined plane of a wall, can be made to go to the pars-basilaris-ossis-occipitalis bottom, and the light by which outgoing radiation was carried out in the various directions from the light emitting device can be collected as much as possible in an one direction, for example, the direction which intersects perpendicularly with the pars basilaris ossis occipitalis of an attachment object, and separates from a pars basilaris ossis occipitalis, and it can carry out outgoing radiation. Therefore, a bright light effect can be acquired, using the light from a light emitting device efficiently.

[0070] In the field-like lighting system of this invention, if the attachment object by shaping resin is really unified to a leadframe, since a leadframe can be firmly positioned to an attachment object and a light emitting device can be fixed to this leadframe, positioning and immobilization of a light emitting device to an attachment object can be ensured.

[0071] The light emitting device installed on the leadframe on the attachment object pars basilaris ossis occipitalis used in the field-like lighting system of this invention irradiates light towards the various directions not only of the top direction of a pars basilaris ossis occipitalis but a perimeter. Although the light by which outgoing radiation was carried out in the top direction of a pars basilaris ossis occipitalis was easy to be used effectively, the light by which outgoing radiation was carried out to the direction in alignment with the pars basilaris ossis occipitalis of an attachment object, i.e., a longitudinal direction, was not effectively used with conventional field-like luminescence equipment. On the other hand, since a part of light by which outgoing radiation was carried out to it being the structure which forms the inclined plane in a wall in the longitudinal direction from the light emitting device can be reflected in the inclined plane of a wall and it can be made to go to the pars-basilaris-ossis-occipitalis bottom, the light by which outgoing radiation was carried out in the various directions from the light emitting device can be collected as much as possible in an one direction, for example, the direction which intersects perpendicularly with the pars basilaris ossis occipitalis of an attachment object, and separates from a pars basilaris ossis occipitalis, and can carry out outgoing radiation. Therefore, the brightness as a field-like lighting system can be raised. Moreover, since a light emitting device is attached in the leadframe attached in the attachment object, the attachment reinforcement of a light emitting device can also be raised.

[0072] In the field-like lighting system of this invention, if the light reflex section is formed in an inclined plane, since light will be strongly reflected by this light reflex section, as a result of being able to condense strongly the light by which outgoing radiation was carried out in the various directions from the light emitting device to an one direction, the field-like lighting system which raised brightness further can be offered. Furthermore, since a leadframe is firmly positioned to an attachment object and a light emitting device is fixed to this leadframe when the attachment object by shaping resin is really unified to the leadframe, positioning and immobilization of a light emitting device to an attachment object are made certainly.

[0073] In the field-like lighting system of this invention, since the light by which outgoing radiation was carried out from the light emitting device also in the structure which prepared the lens member on the transparence resin layer can be condensed in the lens section, the use effectiveness of the light which the light emitting device emitted improves, and a bright field-like lighting system can be offered. Moreover, lens processing of a transparence resin layer becomes unnecessary, and can constitute the lens section from attaching the lens member by which lens processing is carried out beforehand separately as another object on a transparence resin layer easily.

[0074] In the field-like lighting system of this invention, by the light reflex section being formed on the pars basilaris ossis occipitalis of an attachment object, even if it is the light by which outgoing radiation was carried out towards the attachment object pars-basilaris-ossis-occipitalis side from the light emitting device, it can be made to be able to reflect in the light reflex section of an attachment object pars basilaris ossis occipitalis, the outgoing radiation of the light can be made to be able to carry out in the direction which separates from an attachment object pars basilaris ossis occipitalis, and the brightness as a field-like lighting system can be raised more. Moreover, also by forming the light reflex section on the apical surface of a wall, the reflective

effectiveness of light can improve and the brightness as a field-like lighting system can be raised more.

[0075] In the field-like lighting system of this invention, if it is the light reflex section which consists of a metal powder, light can be reflected with a high reflection factor and brightness can be raised more. Moreover, brightness can be improved even if it consists of fluorescent paint as the light reflex section.

[0076] In the field-like lighting system of this invention, condensing effectiveness can be raised by satisfying the formula of |Rlens-{(H1-Hwall) 2+X12} / 2(H1-Hwall) |<0.5, and a bright field-like lighting system can be offered. In the field-like lighting system of this invention, condensing effectiveness can be raised by satisfying the formula of |Rwall-{(X1-X0) 2+Hwall2}/2(X1-X0) |<0.5, and a bright field-like lighting system can be offered. In the field-like lighting system of this invention, condensing effectiveness can be raised by satisfying the formula of |{(Hwall-H)/(X1-X)}-1/21/2|<0.4, and a bright field-like lighting system can be offered.

[0077] Since the field-like lighting system of a publication was mated with the liquid crystal display unit and the liquid crystal display of this invention formed it in either of previous, if it is a liquid crystal display previously equipped with the field-like lighting system of the various structures of a publication, it can use effectively the light which carried out outgoing radiation from luminescence equipment, and can offer the liquid crystal display of a bright high display of efficiency for light utilization.

[Translation done.]

* NOTICES *

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2.**** shows the word which can not be translated.
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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] Drawing 1 is the perspective view showing an example of the liquid crystal display equipped with the field-like lighting system concerning this invention.
[Drawing 2] Drawing 2 is the configuration schematic drawing showing partially the field-like lighting system with which the liquid crystal display concerning this invention was equipped.
[Drawing 3] Drawing 3 is the configuration schematic drawing showing the front light with which the liquid crystal display concerning this invention is equipped, and a liquid crystal display unit.
[Drawing 4] Drawing 4 is the fragmentary sectional view of the liquid crystal display equipped with the front light concerning this invention.
[Drawing 5] Drawing 5 is the flat-surface schematic drawing showing the condition before bending a leadframe in the gestalt of 1 operation of the luminescence equipment concerning this invention.
[Drawing 6] Drawing 6 is the cross-section schematic drawing showing the condition before bending a leadframe in the gestalt of 1 operation of the luminescence equipment concerning this invention.
[Drawing 7] Drawing 7 is the perspective view showing the condition after bending a leadframe in the gestalt of 1 operation of the luminescence equipment concerning this invention.
[Drawing 8] Drawing 8 is applied to the luminescence equipment of the gestalt of previous operation, and is the top view showing an example of a leadframe.
[Drawing 9] Drawing 9 is the top view showing an example of the leadframe of another side applied to the luminescence equipment of the gestalt of previous operation.
[Drawing 10] Drawing 10 is the sectional view showing an example of the light emitting device with which the luminescence equipment concerning this invention is equipped.
[Drawing 11] Drawing 11 is the sectional view showing an example of the metal mold used in order to manufacture the luminescence equipment concerning this invention.
[Drawing 12] Drawing 12 is the sectional view showing the condition of having really fabricated the leadframe and the attachment object with the metal mold shown in drawing 11 .
[Drawing 13] Drawing 13 is the sectional view showing the condition of having formed the reflecting layer, on some of leadframes obtained as shown in drawing 13 , and attachment objects.
[Drawing 14] Drawing 14 is the side elevation showing the condition of having formed the lens section made from a transparent material on the leadframe and attachment object which are shown in drawing 13 .
[Drawing 15] Drawing 15 is the sectional view showing the gestalt of the 1 operation at the time of making the inclined plane of the wall of the luminescence equipment concerning this invention into a curved surface.
[Drawing 16] Drawing 16 is drawing showing the height of a wall and the configuration of a curved-surface-like inclined plane in the luminescence equipment of the gestalt of this operation, and the physical relationship of luminescence equipment.
[Drawing 17] Drawing 17 is the sectional view showing an example of conventional luminescence equipment.

[Drawing 18] Drawing 18 is the sectional view showing other examples of conventional luminescence equipment.
[Drawing 19] Drawing 19 is the block diagram showing an example of the conventional liquid crystal display.
[Drawing 20] Drawing 20 is the partial configuration explanatory view of the front light with which the conventional liquid crystal display was equipped.
[Description of Notations]
C Luminescence equipment
1 Light Emitting Device
2 Attachment Object
2A Pars basilaris ossis occipitalis
2B, 2C, 2D, 2E Wall
2F Inclined plane
2J, 2L, 2M Reflector (reflective section)
5 Six Leadframe
5D, 6D Polar zone
9 Lens Section
L Liquid crystal display
50 Liquid Crystal Display Unit (Liquid Crystal Panel)
51 Front Light
52 Light Guide Plate
53A Transparent material

[Translation done.]

* NOTICES *

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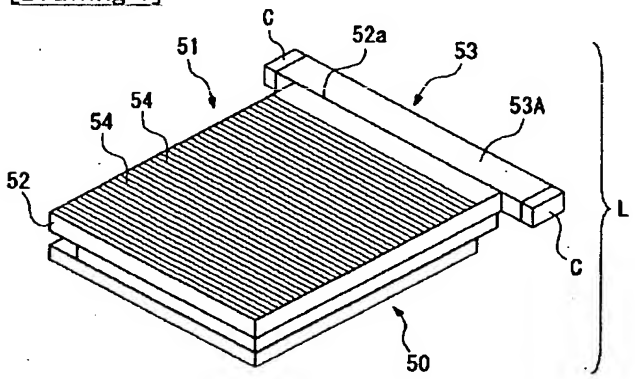
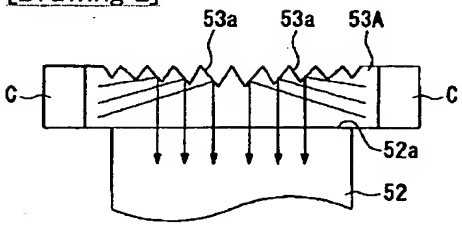
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

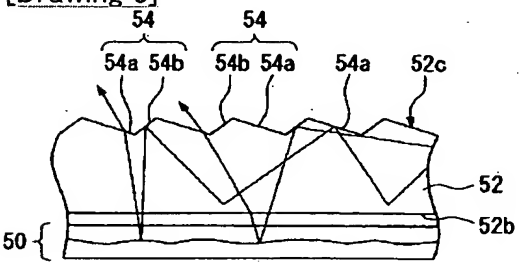
[Drawing 1]



[Drawing 2]



[Drawing 3]



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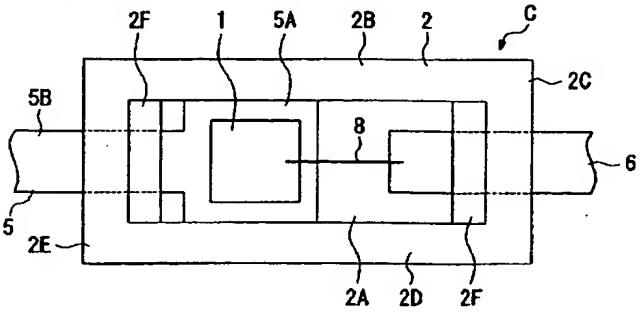

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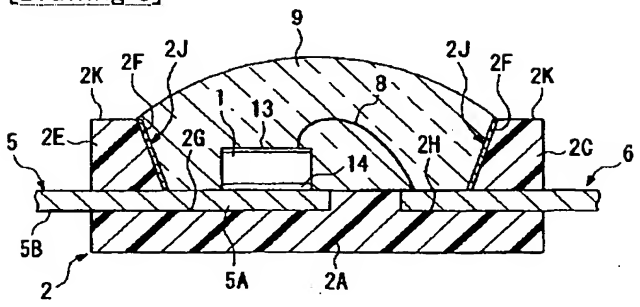

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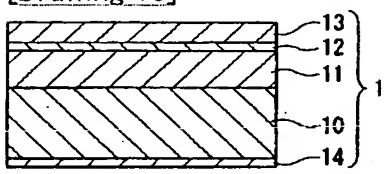

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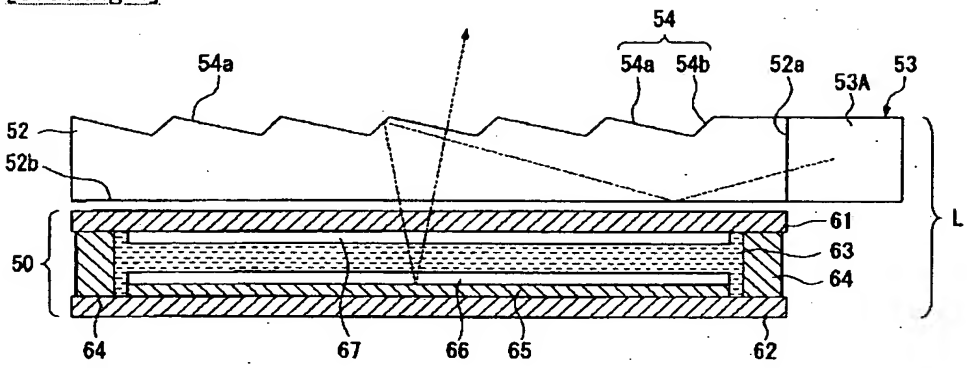

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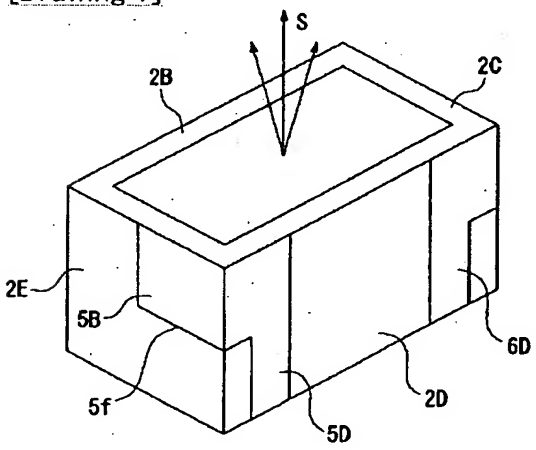
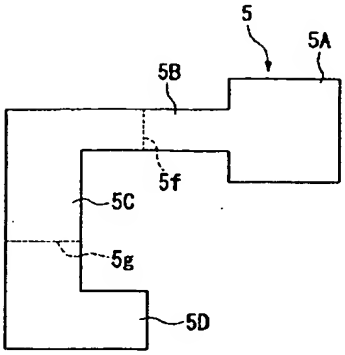
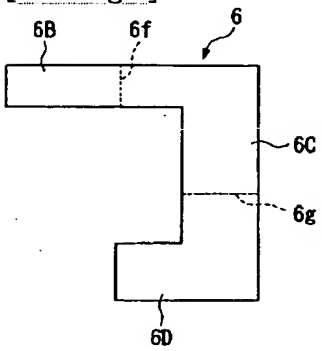


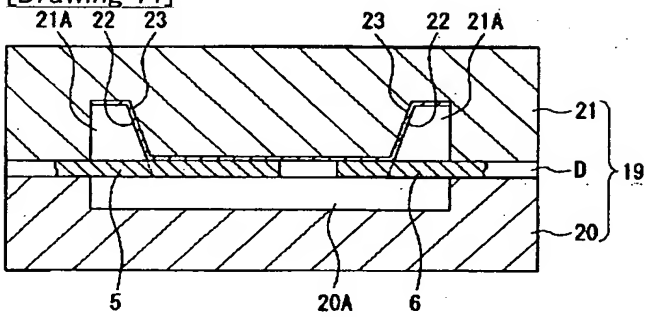
[Drawing 8]



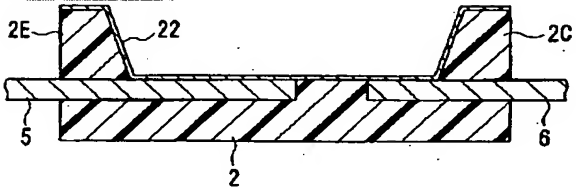
[Drawing 9]



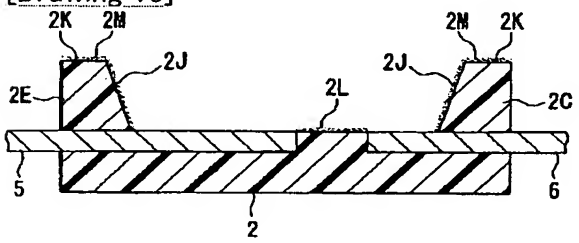
[Drawing 11]



[Drawing 12]



[Drawing 13]



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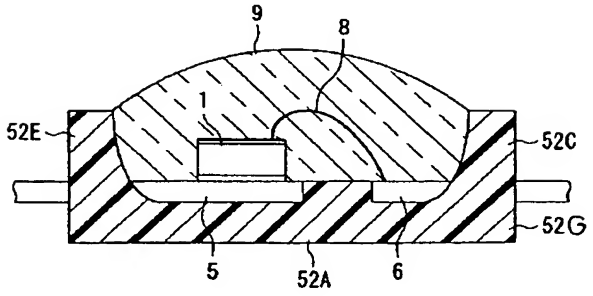

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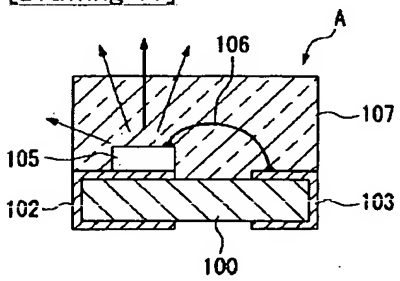
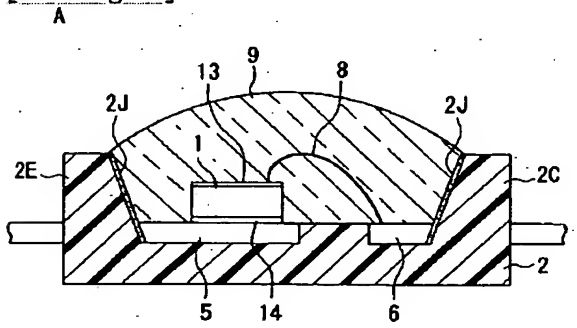
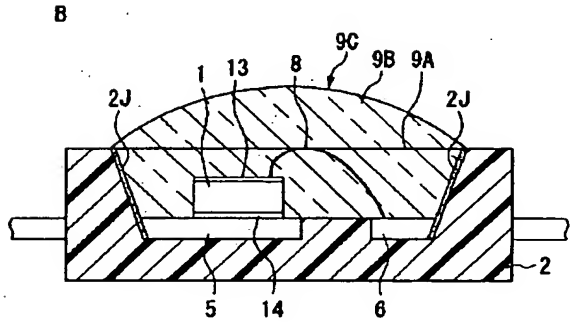


[Drawing 14]





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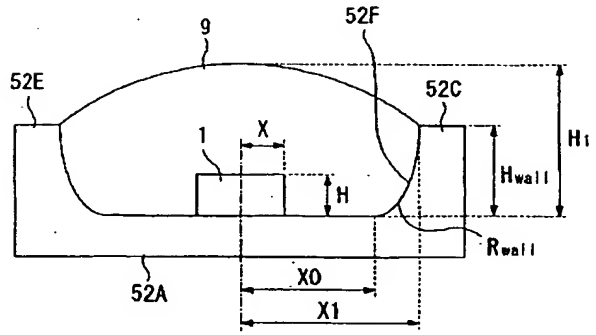
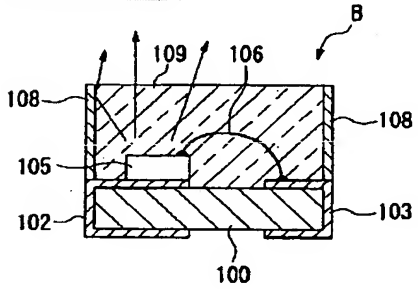
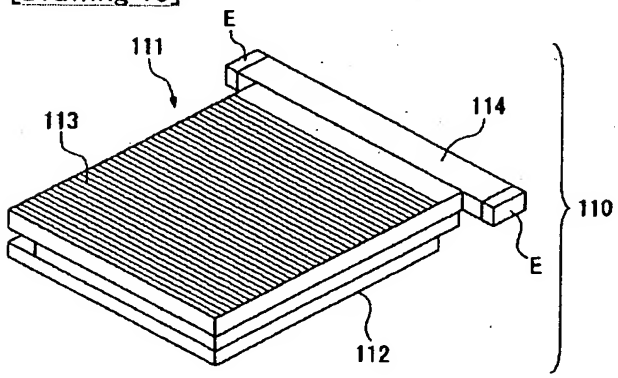


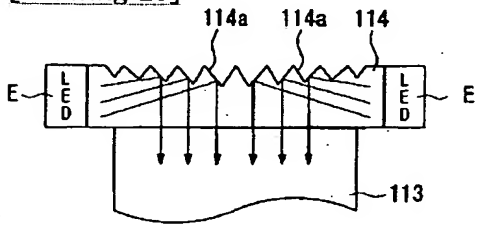
[Drawing 18]



[Drawing 19]



[Drawing 20]



[Translation done.]